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Electron plasma and ion acoustic waves in flat top electron velocity distributions

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We have calculated the complex frequencies of electron plasma waves and ion acoustic waves in non-Maxwellian electron distribution functions that occur in high Z plasmas illuminated by high intensity lasers. The drastic reduction in electron Landau damping and large modification in the sound speed and damping of ion waves have significant consequences for Raman and Brillouin scattering in such plasmas. We explore these ramifications highlighting the changed angular distribution of SRS and the curtailment of long interaction lengths for SBS due to changes in the acoustic speed caused by hot spots in high Z plasmas. This work is motivated by Xe gas bag as well as high temperature hohlraum experiments recently conducted on NOVA at LLNL.

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